RECLAMATION

Managing Water in the West

Using RiverSMART to Simulate Multiple Alternatives as Part of the Glen Canyon Dam LTEMP EIS

RiverWare User Group Meeting
February 4, 2015
Boulder, CO

U.S. Department of the Interior
Bureau of Reclamation

Outline

- Background on LTEMP
- Model configuration
- RiverSMART configuration

Colorado River Basin

Background

- LTEMP = Long-term Experimental and Management Plan
- Glen Canyon Dam LTEMP EIS is evaluating dam operations to provide a framework to adaptively manage Glen Canyon Dam over the next 15-20 years
- Reclamation and National Park Service are joint co-leads of EIS
- EIS is exploring changes to intra-annual operations, i.e., the 2007 Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lakes Powell and Mead will not be modified

Background

- LTEMP is exploring the effects of different operational elements on many different resources
- Operational elements being considered include high flow releases for sediment conservation, non-native fish control actions, ramping constraints, daily release constraints, and monthly distribution of releases
  - Alternatives explore different combinations of operational elements, e.g., high flow experiments during all 20 years vs. only the last 10 years
- Resources include aquatic hydrology, hydropower, sediment, tribal values and resources, and water delivery
  - Multiples performance metrics may exist for each resource
  - Use the performance metrics to compare the alternatives

LTEMP Modeling Diagram

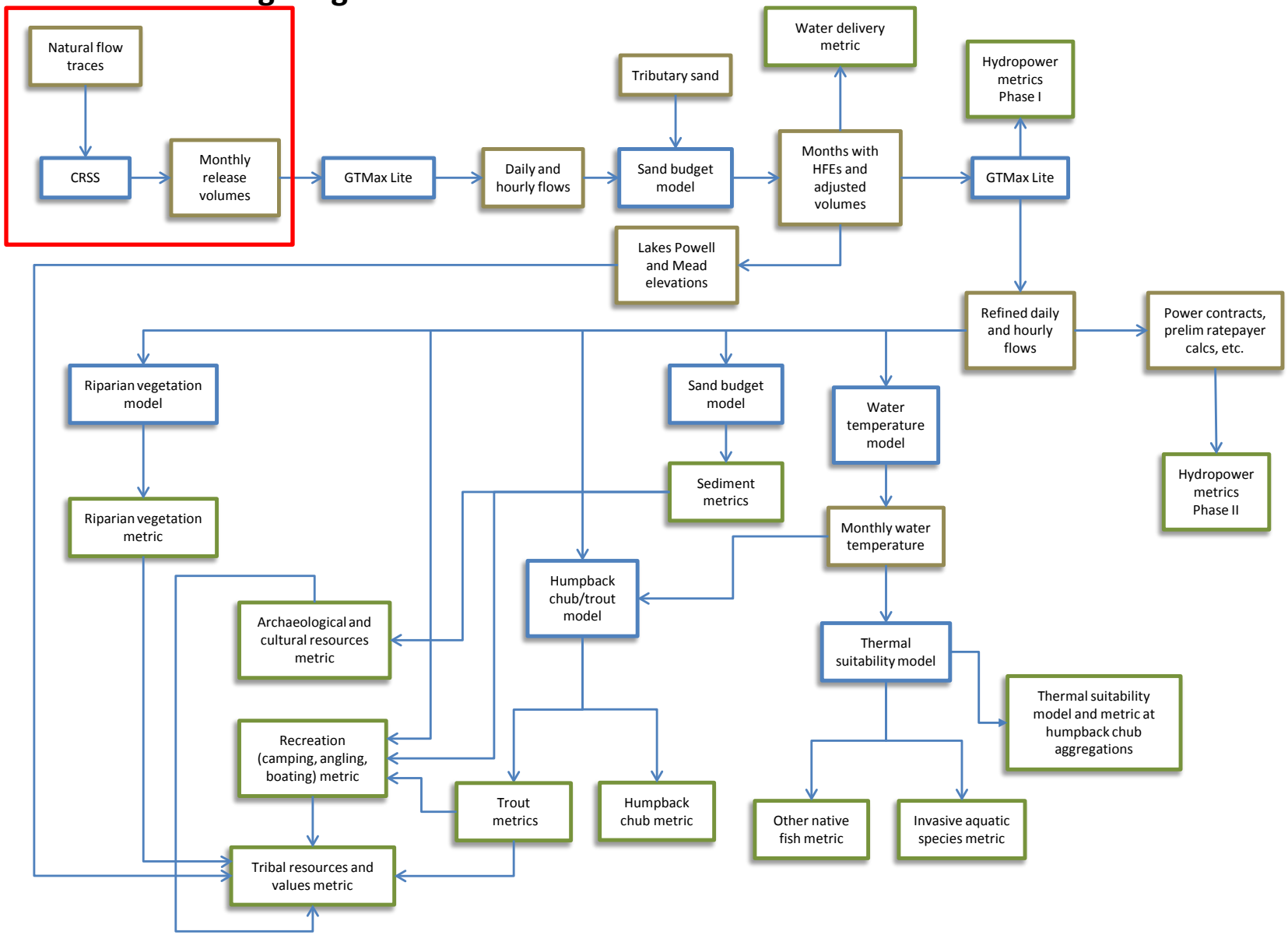


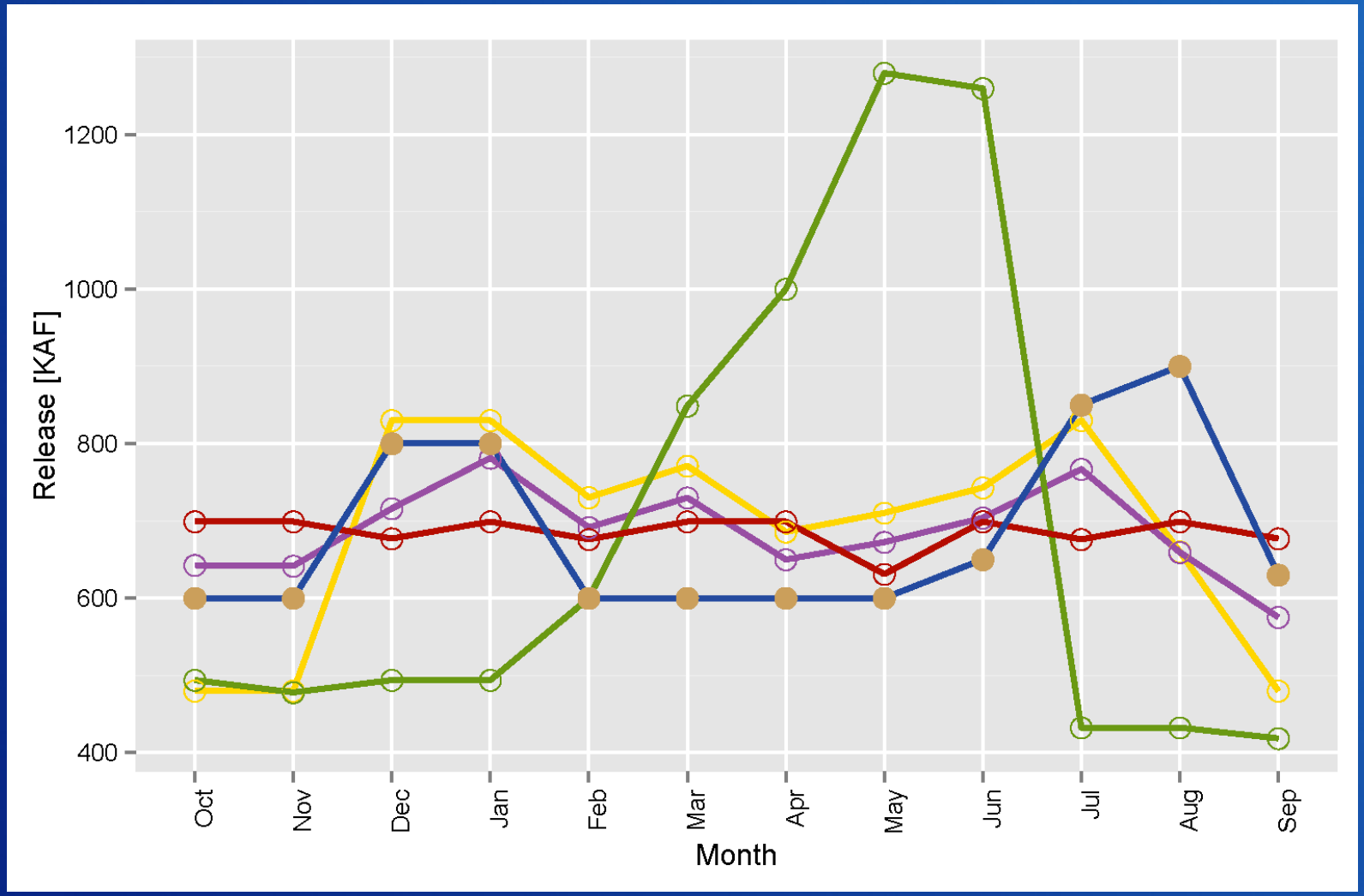
Diagram courtesy Argonne National Laboratory

CRSS Configuration

- Colorado River Simulation System (CRSS)
  - Comprehensive, basin-scale planning model for the Colorado River Basin
  - Monthly timestep
  - Excels at comparative analyses

- Configuration for LTEMP
  - Used 21 hydrologic inflow traces
  - Primarily compares different monthly release distributions
  - Observed December 31, 2012 reservoir levels as initial conditions
  - Primary output data are monthly releases and elevations at Powell for use by other models

Monthly Hydrographs of Different Alternatives



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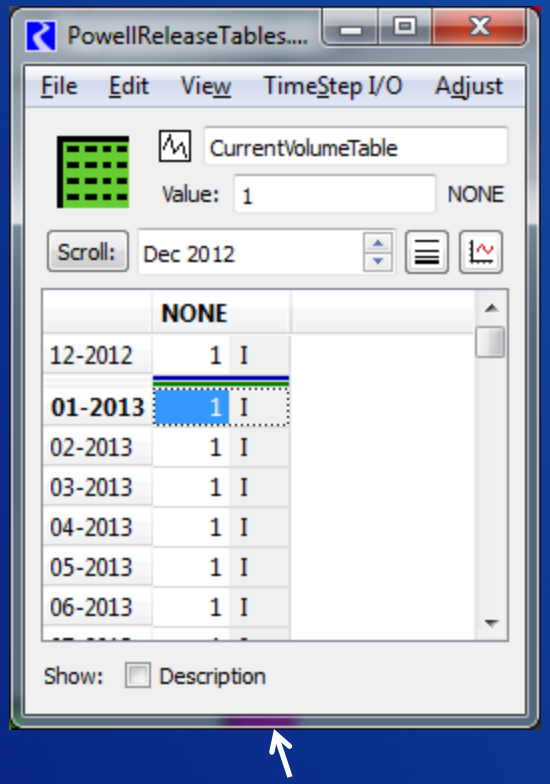
Input of Alternatives in CRSS



DMI modifies this slot. This slot tells rules which monthly volumes table to use and how other parameters may change.

PowellReleaseTables.MonthlyVolumes1

File Edit Row Column View Adjust

MonthlyVolumes1

Value: 480 1000 acre-ft

	7.0 1000 acre-ft	7.48 1000 acre-ft	8.23 1000 acre-ft	9 1000 acre-ft	9.5 1000 acre-ft
0: October	480	480	600	600	600
1: November	500	500	600	600	600
2: December	600	600	800	800	800
3: January	600	800	800	800	850
4: February	600	600	600	650	650
5: March	500	600	600	650	650
6: April	500	500	600	600	650
7: May	500	600	600	650	800
8: June	600	600	650	800	900
9: July	800	800	850	1,000	1,050
10: August	800	800	900	1,050	1,100
11: September	520	600	630	800	850

Show: Description

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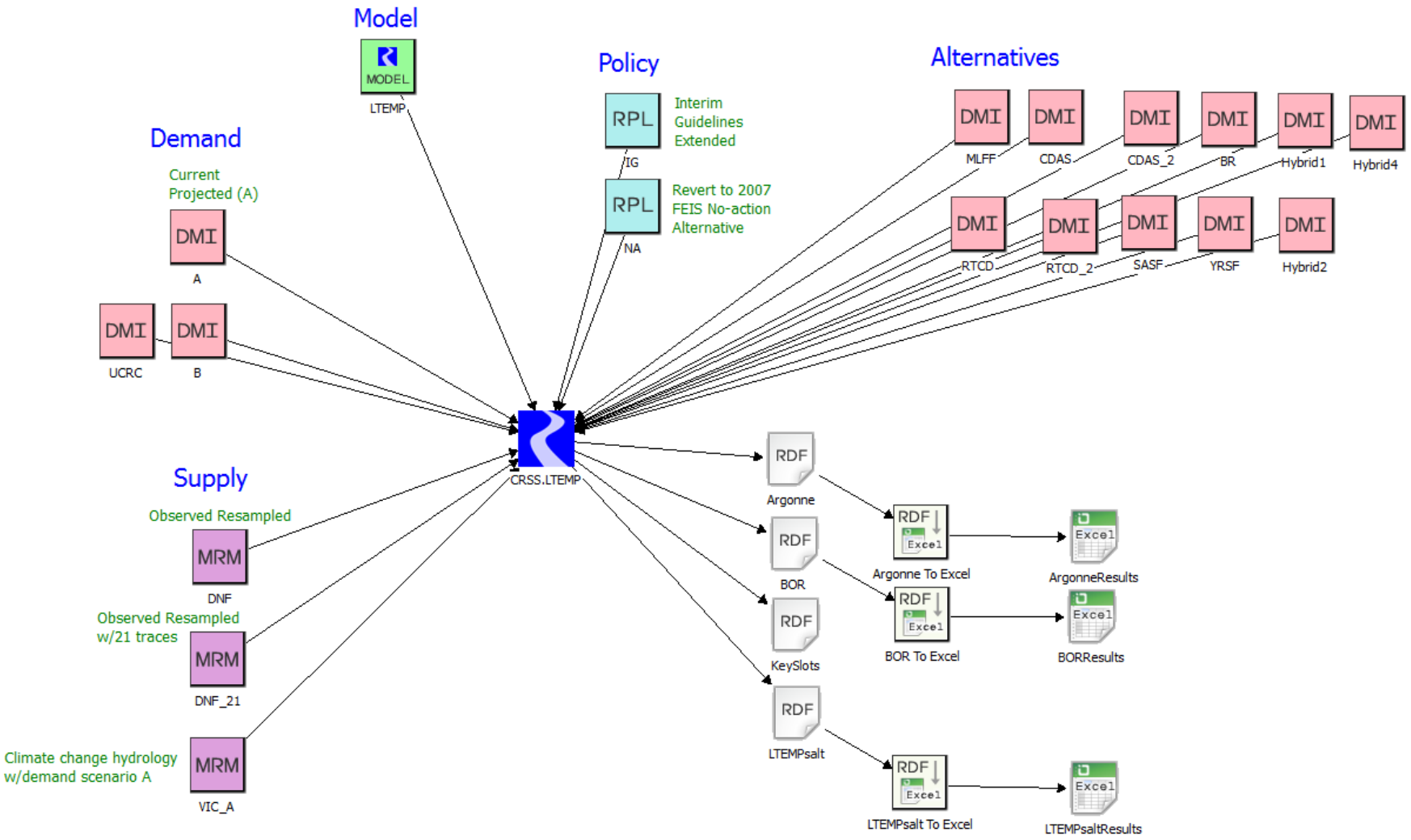
Steps to Manually Run Alternatives in CRSS

1. Modify the alternative selection slot either manually or with DMI.
2. Save model.
3. Run desired MRM configuration.
4. Wait.
5. Move results (rdfs, etc.) from default location to a unique folder.
   - Be sure to use the same naming convention for all scenarios.
6. Repeat starting at 1 for all scenarios.

RiverSMART Configuration



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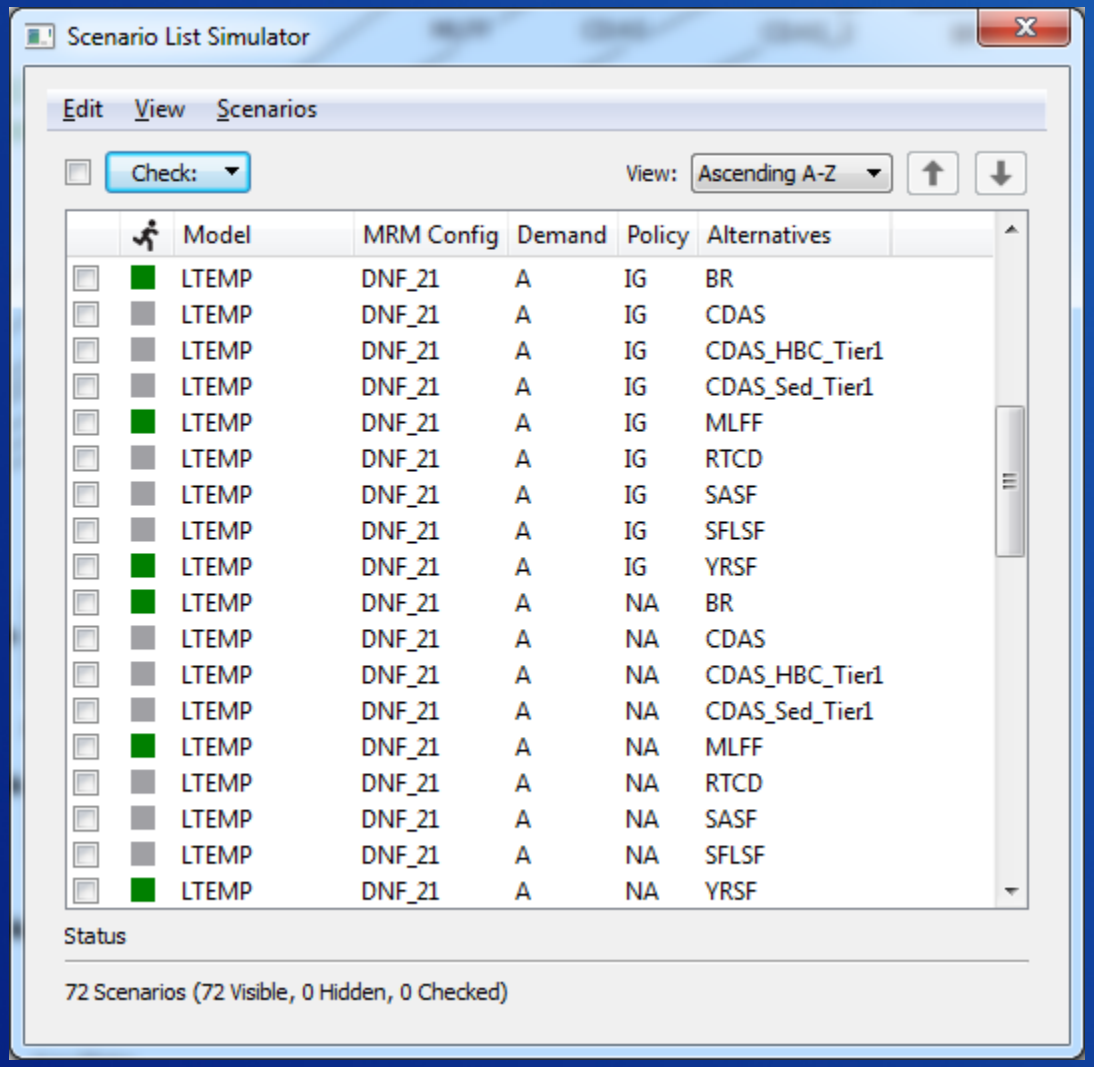
RiverSMART Configuration



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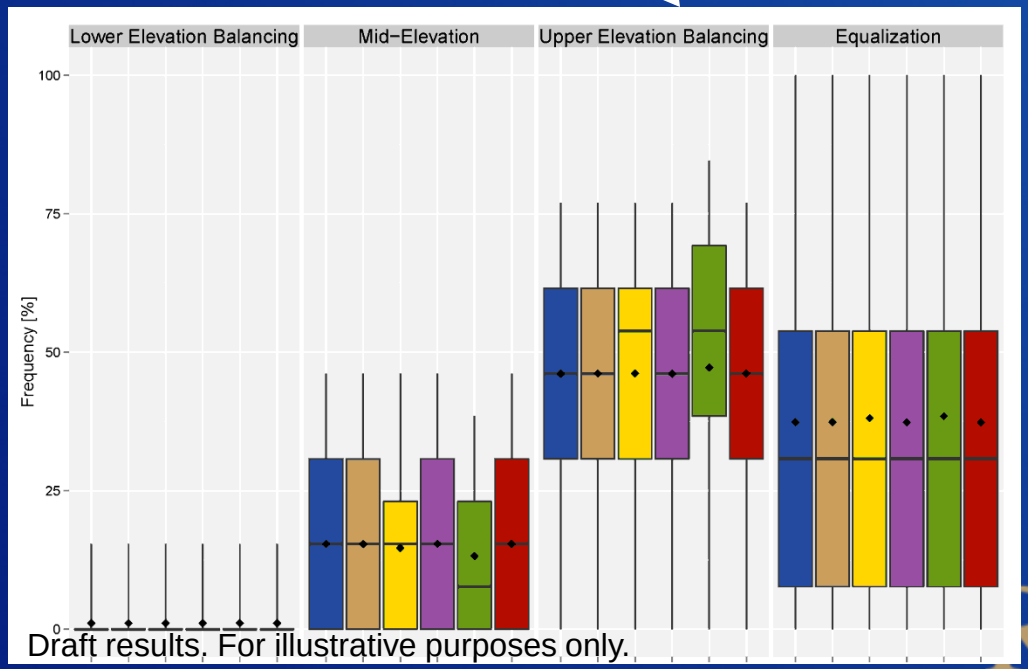
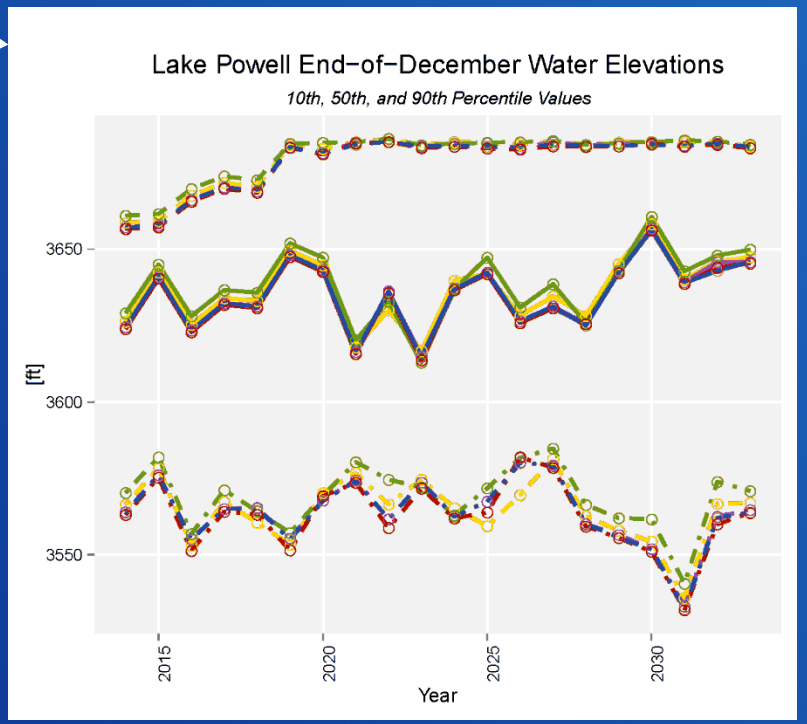
Output

DNF_21,A,IG,BR	1/2/2014 10:26 AM	File folder
DNF_21,A,IG,CDAS	1/2/2014 10:26 AM	File folder
DNF_21,A,IG,CDAS_2	1/2/2014 10:26 AM	File folder
DNF_21,A,IG,MLFF	1/22/2014 10:14 AM	File folder
DNF_21,A,IG,RTCD	1/2/2014 10:27 AM	File folder

Scenario output folders organized by RiverSMART

R function(s)





Draft results. For illustrative purposes only.

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Discussion

- RiverSMART greatly expedites modeling many scenarios managing the output from the RiverWare simulations, and processing the results.
- R plugin in RiverSMART
- Could RiverSMART provide a framework to loosely couple *all* of the models together?